

REMARKS

This Amendment is in response to the Office Action mailed on May 8, 2002 in which claims 1-35, 41-43 and 62-66 were elected for prosecution. In the Office Action claims 1-35, 41-43 and 62-66 were rejected under 35 U.S.C. §102(b) as being anticipated by Turtle U.S. Patent No. 5,265,065. With this Amendment claims 41 and 43 are amended, claim 42 is canceled, and the remaining claims are unchanged. Reconsideration and allowance of claims 1-35, 41, 43 and 63-66 are respectfully requested in view of the following discussion.

On page 2 of the Office Action claim 1 was rejected as being anticipated by Turtle, U.S. patent 5,265,065. The Office Action indicated that Turtle teaches the invention substantially as claimed, including obtaining a set of relations, identifying constituents in the first textual input that have the relations, and determining the relationship between the first and second textual inputs based on the constituents identified. Applicants respectfully disagree with the Office Action's assertion.

Turtle is directed to a system and method for parsing a natural language textual input and converting the input into a formatted search query. Specifically, to convert the natural language input into the formatted query the system in Turtle first takes the input phrase or query and removes all of the stop words, or common words in the query. These stop words include, for example, articles such as "a" or "the", prepositions such as "on", "to", or "in", and verbs such as "is", "are", "will", and "was". Once the stop words are removed, Turtle then reduces the remaining words to their stem or root form. For example, the word "United" is reduced to its root word of "Unit". Once all the remaining words have been reduced to their respective stem or root word, the system in Turtle then removes all duplicate words occurring in the query, keeping only the first occurrence of each duplicated word.

Following the stemming process Turtle goes through each of the remaining words (which have been stemmed) in the formatted search query and pairs the first word with the next word in the chain of words in an attempt to find a phrase match in a phrase database for the stemmed word pairs. If the stemmed word pairs are found in the database, the system in Turtle replaces the stemmed word pair with the phrase found in the database. Otherwise, Turtle starts over with the second word of the stemmed word pair becoming the first word in a new stemmed word pair and repeats the process until all of the stemmed words have been analyzed for phrases in the phrase database. Once all of the words have been analyzed, Turtle then searches the document database for those documents that match the replaced phrases and stemmed words, and presents the results of the search to the user based on a relevant score. Turtle can search an entire database, or a selection of the database such as a document summary. Further, Turtle has the capability to treat non-word entries as if they were words for the purposes of the searching process. For example, a non-word entry may be a legal case citation.

In contrast, Claim 1 of the present invention is directed to a method for determining a relationship between first and second textual inputs. The method requires obtaining a set of relations, identifying constituents in the first textual input having the relations, and determining the relationship between the first and second textual inputs based on the constituents identified.

In the first step the method of claim 1 obtains a set of relations for the first textual input. Relations are defined on page 9 of the Specification as both grammatical relations and case information for the selected word. Grammatical relations are discussed on pages 5-6 and are, for example, grammatical identifications for the selected word such as, subject, object, and prepositional phrase. Case information is described on pages 6 -7 and is, for example, information such as part of speech,

morphological inflections, and word boundaries. When presented with a textual input the method of claim 1 breaks the textual input into parts and assigns a relation to each part of the textual input. In the second step the method of claim 1 takes the relations obtained in the first step and identifies related constituents for that relation. Constituents are defined on page 17 of the Specification as, for example, noun phrases and verb phrases of the textual input. Thus the second step creates an annotated constituent which contains information that can be used during later processing. In the third step the method of claim 1 takes the annotated constituents and determines the relationship between the first and second textual inputs based on the constituents identified.

The differences between Turtle and the present invention can be best shown by reference to the following hypothetical input: "Was there a fly on the airplane?". The system of claim 1 starts with "a set of relations." The system then identifies constituents in the input that have the relations. For example, assume the set of relations to be used in matching includes "subject" and "object." Then using grammatical relationships, the method of claim 1 would identify the word "fly" as the subject and the word "airplane" as the object. Thus, the method of claim 1 would identify a relationship between the input and documents based on the word "fly" as the subject and the word "airplane" as the object.

In contrast, in the above example where the textual input was "Was there fly on the airplane?", Turtle would identify different aspects of the input to be used in the search. Turtle would first remove all of the stop words yielding a search list words of "there", "fly", and "airplane". Turtle would then proceed to stem these words to their root form. In this example, the words "fly" and "airplane" would not be stemmed as they are in their base form. Turtle would then proceed to search the

database and attempt to find in the predefined phrase database a phrase that either matched "there fly" or "fly airplane". In all likelihood Turtle would not find in its predefined phrase database either of these phrases.

Thus, one of the differences between the method of claim 1 of the present invention and the method disclosed in Turtle is the way the two systems create their respective constituents. In Turtle, constituents are created by comparing the stemmed words with words that appear in a predefined database to determine if the words are a phrase. Turtle simply does not use "relations" at all. By contrast, claim 1 specifically includes "identifying constituents... that have the relations" in the obtained set of relations, and determining a relationship between the inputs based on those constituents.

Turning now to dependent claim 2 of the present invention, claim 2 adds the additional limitation that the first and second documents are compared using both the constituents and the relations. The Office Action indicated that Turtle taught this feature in column 11, lines 43-48 and column 12, lines 59-68. The Applicant has thoroughly reviewed the teachings of the Turtle reference, and cannot find any teaching where the system compares the two documents using either grammatical relations, or case relations of the words. The section cited by the Office Action refers to creating a "key number" from the inputted questions, or searching for additional words in the document that have a related meaning using a predefined database of related words. However, these additional search words are created using the same stemmed words as discussed above with regards to claim 1. As discussed above, Turtle does not consider the relationship between the various words or phrases in the formatted search query.

With respect to claim 2, and using the example discussed above the invention would look for documents where "fly" is the

subject. By contrast, Turtle would return to the user as high ranking results documents which were directed to the flying of airplanes (i.e., where "fly" is a verb), because it does not take into account the relations. These documents are totally unrelated to the search that the user had inputted. The user would then have to proceed through all of the documents in order to determine if any of the documents contained information about a fly on an airplane and not how to fly an airplane or airplane flight. As the limitations of claim 2 are not taught or suggested by Turtle it is believed that dependent claim 2 is allowable over the Turtle reference either independently or by virtue of its dependency from allowable claim 1. Reconsideration and withdrawal of the rejection are respectfully requested.

Turning now to dependent claim 3 of the present invention, claim 3 adds the additional limitation to claim 1 of obtaining a hierarchy of grammatical relations, and obtaining a hierarchy threshold based on a usefulness of the grammatical relations. The Office Action indicated that Turtle shows a hierarchy of grammatical relations in element 40 of FIG. 4, and obtains a hierarchy threshold based on a usefulness of grammatical relations in the hierarchy in determining the relationship between the first and second textual inputs is shown by element 44 of FIG. 4. Element 44 of Turtle does not show a hierarchy threshold based on the usefulness of grammatical relations. It shows the constituent words still in stemmed form, where some of the stemmed words are grouped as phrases. The words presented in element 44 of Turtle are in the same order as the stemmed words were presented in the original query language. Turtle does not consider the "relations" of these words and phrases in the formatted search query. Furthermore, each word presented in element 44 has the same relative importance when the documents are searched for matches. Therefore, Turtle cannot determine the relative importance of each word in the list based on its

grammatical relation. As Turtle does not teach or suggest the specific limitations of claim 3 it is believed that dependent claim 3 is allowable over Turtle. Furthermore, dependent claims 4-12 are believed allowable over Turtle by virtue of their dependency either directly or indirectly on allowable claims. Reconsideration and withdrawal of the rejection are respectfully requested.

Turning now to dependent claim 13 of the present invention claim 13 adds the additional limitation to claim 1 of obtaining a hierarchy of case information, and obtaining a hierarchy threshold based on the usefulness of a constituent having that case. Case information is defined at page 6-7 in the Specification as for example, part of speech, morphological inflections, and word boundaries. The Office Action indicated that this limitation was taught in column 15, lines 1-17 of Turtle. However, the section referred to by the Office Action shows returning results based on a partial phrase match, and not a hierarchy of case information. Nowhere in Turtle is it shown that the system considers such factors as the word's part of speech or its morphological inflections. Turtle is entirely dependent on the predefined phrase database, and the use of stemmed forms, which is the opposite of inflected forms. As Turtle does not consider the case information or the hierarchy of case information, it is believed that dependent claim 13 is allowable over Turtle. Furthermore, dependent claims 14-22 are believed allowable over Turtle by virtue of their dependency either directly or indirectly on allowable claims. Reconsideration and withdrawal of the rejection are respectfully requested.

Turning now to independent claim 23 of the present invention, claim 23 recites a method for determining a relationship between first and second textual inputs including "analyzing the first textual input to obtain relations of

constituents thereof." Further independent claim 23 requires determining a relative importance of the constituents in determining the relationship between the first and second textual inputs based on the relations obtained, and determining the relationship between the first and second textual inputs based on the constituents and the relative importance of the constituents.

The Office Action indicated that the limitations of independent claim 23 were taught by the Turtle reference. However, as discussed above with regards to independent claim 1 and dependent claims 3 and 13 Turtle does not rank the constituents in any manner and in particular does not rank the constituents based on their relative importance. Furthermore, Turtle does not determine a relationship between the first and second textual inputs based on the relative importance of the constituents. In fact all Turtle does is present to the user the results of a comparison of documents based on the number of words in the search query that appear in the document as either individual words or phrases. As Turtle does not teach the limitations of claim 23 it is believed that independent claim 23 is allowable over Turtle. Furthermore, dependent claims 24-32 are believed allowable as well by virtue of their dependency either directly or indirectly from allowable independent claim 23. Reconsideration and withdrawal of the rejection are respectfully requested.

Turning now to independent claim 33 of the present invention claim 33 requires that the plurality of constituents have a predetermined usefulness in determining the relationship based on relations of constituents in the textual material. As discussed above Turtle does not teach or suggest determining the usefulness of the constituents in determining the relationship between two textual inputs. As Turtle does not disclose the computer readable medium having a plurality of constituents having a predetermined usefulness, it is believed that independent claim 33 is allowable

over Turtle. Furthermore, dependent claims 34 and 35 are believed allowable as well by virtue of their dependency from allowable claim 33. Reconsideration and withdrawal of the rejections are respectfully requested.

Turning now to independent claim 41 of the present invention, claim 41 is directed to a computer readable medium storing a data structure used in determining a relationship between the first and second textual inputs. The data structure comprises a plurality of pre-computed aspects of at least one of the first and second textual inputs. The pre-computed aspects are useful in determining a relationship between the first or second textual inputs. Further claim 42 includes the additional limitation of a plurality of pre-computed aspects includes a linguistic analysis of at least a portion of the first and second textual input. With this Amendment the limitations of claim 42 have been included in claim 41. Turtle does not teach or suggest use of precomputed linguistic analysis as a factor in a data structure used in determining the relationship between first and second textual inputs. Therefore it is believed that independent claim 41, as amended, is allowable over Turtle. Furthermore, claim 43 is amended to include within the data structure a plurality of constituents wherein those plurality of constituents have a predetermined indication of usefulness. As discussed above, it is believed that Turtle does not teach or suggest these limitations of claim 43. Therefore it is believed that dependent claim 43 is independently allowable and is further allowable by virtue of its dependency from allowable independent claim 41. Reconsideration and withdrawal of the rejection are respectfully requested.

Turning now to independent claim 62 of the present invention. Claim 62 is directed to a method for determining a relationship between the first and second textual inputs. The method comprises obtaining a hierarchy of relations, obtaining a

hierarchy threshold based on the usefulness of the relations. The method of claim 62 further comprises identifying constituents in the first textual input that have the relations in the hierarchy, and determining the usefulness of the identified constituents by locating the identified constituents in the hierarchy. Finally, the method of claim 62 determines the relationship between the first and second textual inputs based on the identified constituents having an associated relation above the hierarchy threshold. As discussed above with regards to claim 1 Turtle does not teach or suggest a hierarchy of relations. Furthermore, Turtle does not teach obtaining a hierarchy threshold based upon a usefulness of the relations in determining the relationship between the first and second textual inputs. As Turtle does not teach a hierarchy of relations it is believed that independent claim 62 is allowable over Turtle. Reconsideration and withdrawal of the rejection are respectfully requested.

Turning now to dependent claims 63-66, claims 63-66 are dependent from claim 1, and contain the additional limitations of obtaining case information based on the usefulness of a constituent having that case, and obtaining grammatical relation information based on the usefulness of a constituent having that grammatical relation. Claims 63-66 have the limitations of both dependent claims 3 and 13 for determining the relationship between a first and second textual input. As the limitations contained in both dependent claims 3 and 13 are recited in dependent claim 63, and dependent claims 3 and 13 are believed independently allowable over Turtle; the combination of the limitations of claims 3 and 13 is allowable as well over Turtle. Furthermore, it is believed that dependent claims 64-66 are allowable as well by virtue of the dependency from allowable claim 63. Reconsideration and withdrawal of the rejection are respectfully requested.

In conclusion it is believed that claims 1-33, 41-43 and 62-66 are allowable over Turtle. Reconsideration and allowance of claims 1-35, 41, 43 and 62-66 are respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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MARKED-UP VERSION OF REPLACEMENT CLAIMS

41. (Amended) A computer readable medium storing a data structure used in determining a relationship between first and second textual inputs, the data structure comprising:

a plurality of pre-computed aspects of at least one of the first and second textual inputs, the pre-computed aspects being useful in determining the relationship between the first and second textual inputs-;

wherein the plurality of pre-computed aspects includes a linguistic analysis of at least a portion of the first and second textual inputs.

Claim 42 has been canceled.

43. (Amended) The computer readable ~~input-medium~~ of claim 41 wherein the plurality of pre-computed aspects include:

a plurality of constituents of the first or second textual input; and

a predetermined indication of usefulness, associated with the plurality of constituents, in determining the relationship between the first and second textual inputs.